Federal Highway Administration (FHWA) and Climate Change Adaptation

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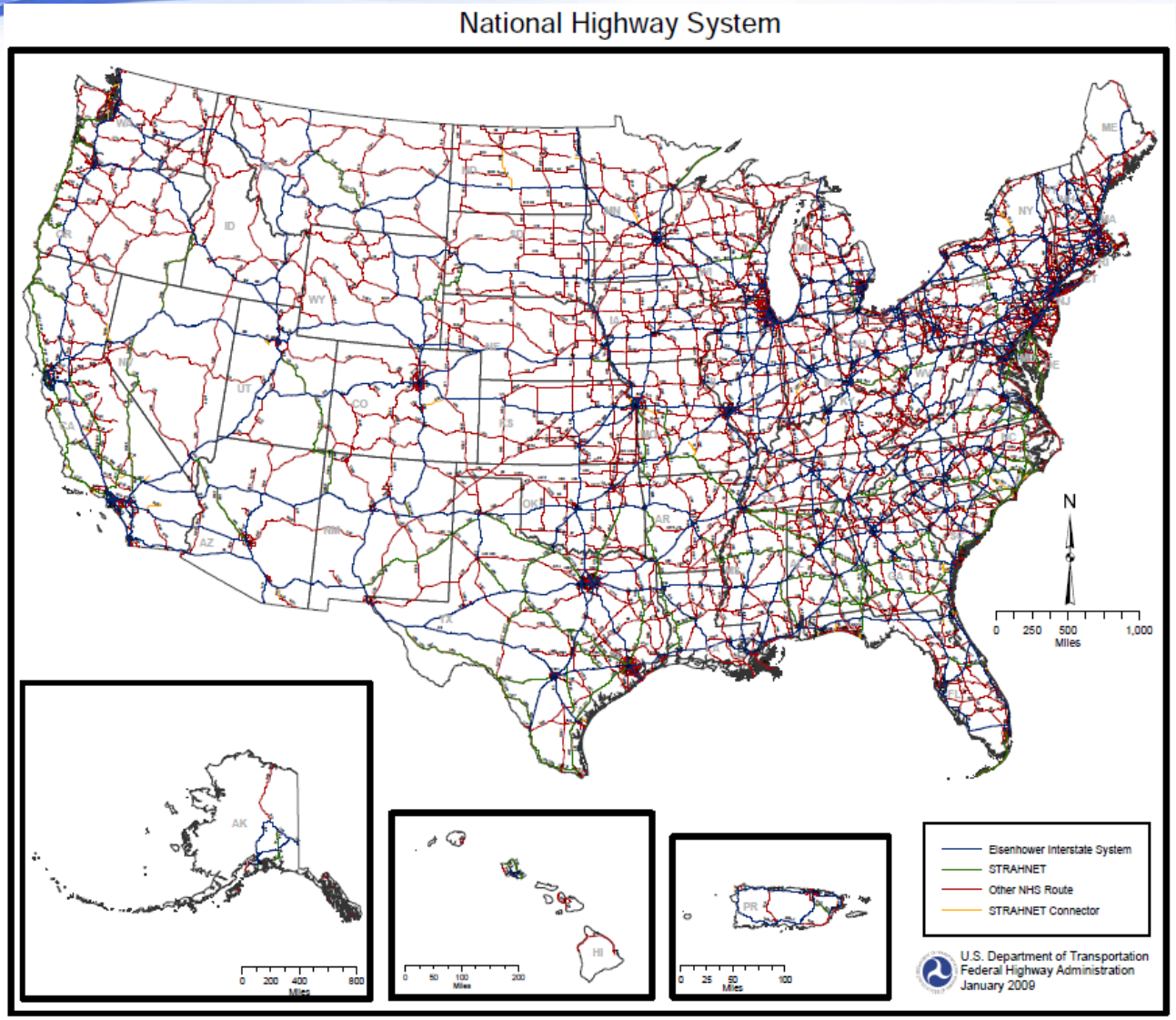


Why be Concerned about Climate Change Impacts?

- **Design life of transportation infrastructure: decades or longer**
- **As climate changes, our infrastructure will need to evolve to handle new conditions**
- **Each region has unique transportation assets, and faces different vulnerabilities and risks**
- **What are the State's risks?**

FHWA and Climate Change Adaptation

Goal: systematic consideration of climate change vulnerability and risk in transportation decision making

- Systems level (Metropolitan, Statewide planning) & individual projects, as appropriate

- **Motivations**
  - Internal: protect integrity of transportation investments, safety
  - External: CEQ guidance on addressing climate change in NEPA and Adaptation Planning

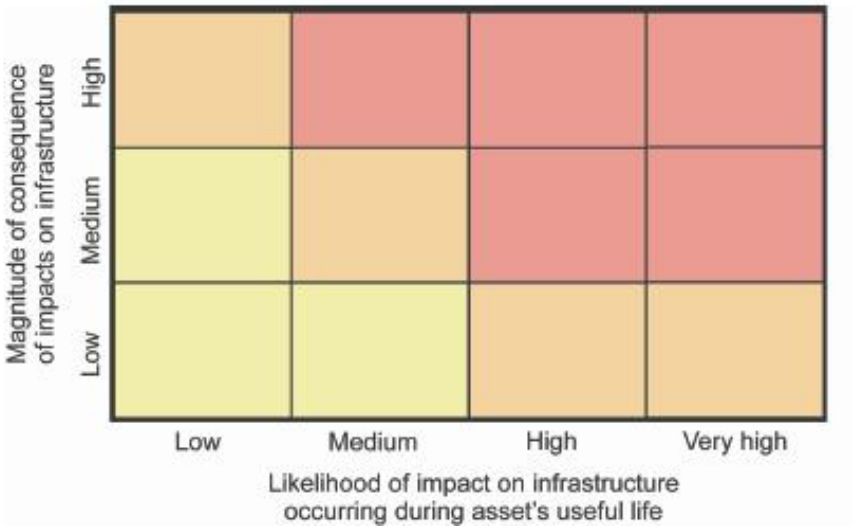
- **Interdisciplinary cooperation is key to effort**
  - Represents cooperative effort of multiple offices in FHWA, U.S. DOT, AASHTO, AMPO, and partnerships with science agencies such as USGS

FHWA Agency-Wide Adaptation Work

- **Climate Change Adaptation Working Group formed in 2009 to discuss adaptation considerations in the highway context with representatives from across FHWA offices:**
  - **Planning, Environment, and Realty**
  - **Infrastructure**
  - **Operations**
  - **Safety**
  - **Federal Lands Highways**
- **Developed draft adaptation strategy to outline:**
  - **Key climate adaptation areas in which FHWA will focus its attention**
  - **How FHWA intends to help transportation agencies adapt**

FHWA Adaptation Initiatives

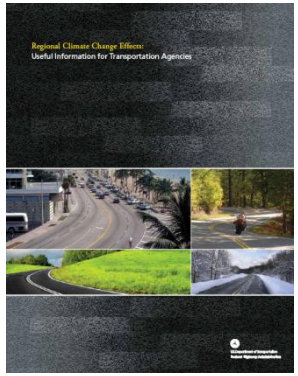
- **FHWA is developing and sharing information on tools and methodologies that states and MPOs can use to assess risk and prioritize actions:**
  - **Climate projections**
  - **Critical asset identification**
  - **Vulnerability assessment methodologies**



Source: City of New York

Regional Climate Change Effects Report (2010)

- **Report synthesizes information on climate change projections for transportation decision makers**
  - **Snapshot: Summarizes recent science**
- **Projected *changes* by region**
  - **Annual, Seasonal Temperature (change in ºF)**
  - **Seasonal Precipitation (% change)**
  - **Where information exists:**
    - Sea level rise, Storm activity

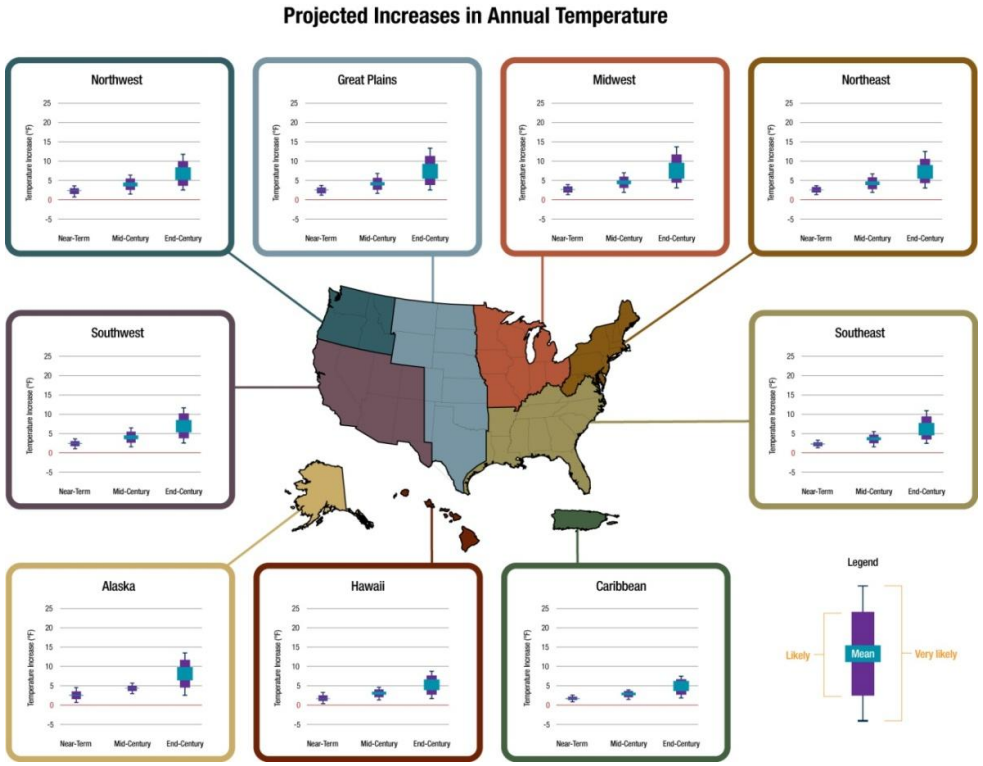


- **Also includes information at local, state scales**
- **Received assistance from climate experts at NOAA, USGS, DOE, etc.**

http://www.fhwa.dot.gov/hep/climate/climate_effects/

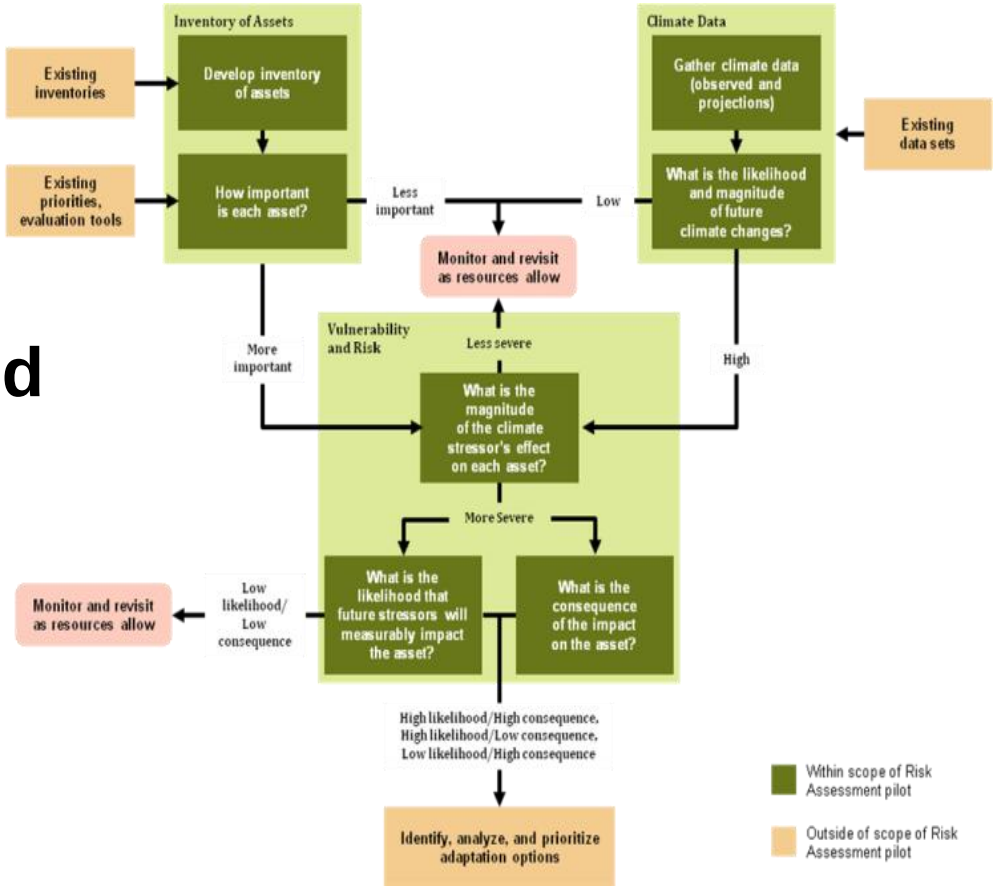
How Can This Information Be Applied?

- **Inform planning efforts with a <u>consistent</u> set of projections**
- **Inform consideration of vulnerability of key assets**
- **Not detailed/certain enough for definitive decisions on specific projects**

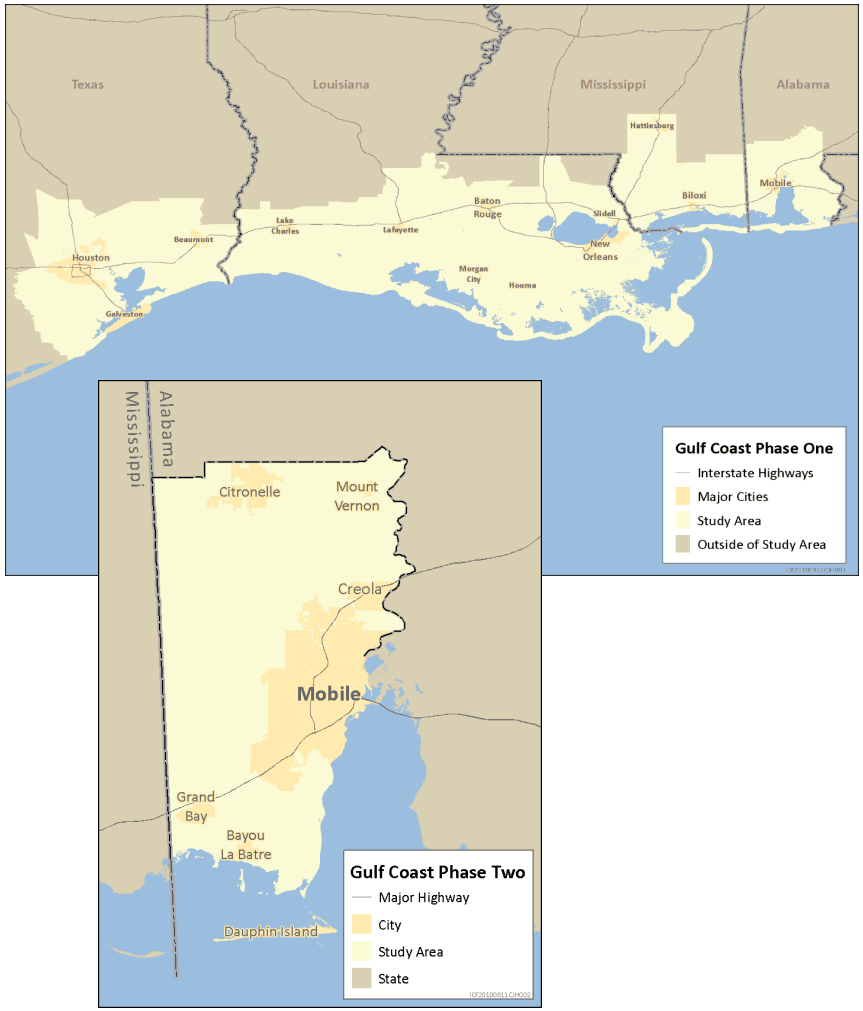


Vulnerability/Risk Assessment Conceptual Model

- Develop inventory of infrastructure assets
- Gather climate data
- Assess vulnerability and risk of assets to projected climate change
- Analyze, prioritize adaptation options
- Monitor and revisit



Gulf Coast Project Examines Issues at Metropolitan Scale



- **Phase 1**
  - Overview of climate change impacts on transportation infrastructure in central Gulf Coast (completed 2008)
- **Phase 2**
  - Focus on one metropolitan area – Mobile, AL
  - Development of adaptation tools and strategies that will be transferable to other areas
  - Timeframe: 2010-2013

Task 1: Identify Critical Transportation Systems

- **Delineate important assets**
- **Develop scoring summary based on available data**
- **Apply engineering judgment to fill data gaps**
- **Consider redundancy**

	HIGHWAYS											
	SocioEconomic					Ops.		Health and Safety				
	Component of National/International Commerce System	Important Multi-Modal Linkage	Functions as Community Connection	No System Redundancy	Serves Regional Economic Centers	Functional Classification (Interstate, etc.)	Usage	Identified Evacuation Route	Component of Disaster Relief and Recovery Plan	Identified Hazardous Materials Route	Component of National Defense System	Provides Access to Health Facilities
Facility List												
Facility A												

Climate Change Adaptation Peer Exchanges

- **Peer Exchanges conducted in 2008 and 2009**
  - **Involved representatives of state DOTs and FHWA Division Offices to discuss climate change adaptation approaches with staff from FHWA Headquarters and AASHTO**
- **Identified common barriers to adaptation efforts:**
  - **Information gaps (e.g., mapping and scenario modeling, funding opportunities)**
  - **Knowledge gaps (e.g., state legislature, environmental permitting agencies, developers, the public)**
  - **Lack of coordination (with federal and state agencies)**
  - **Lack of understanding of how to link existing efforts to adaptation strategies**
- **Three peer exchanges planned for 2011-2012**

What is Transportation Asset Management?

A strategic and systematic process of operating, maintaining, upgrading and expanding physical assets effectively throughout their lifecycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well defined objectives.

FHWA Cooperating with EPA

- Federal Highway Administration (FHWA) and USEPA Memorandum of Understanding for Collaboration on Asset Management,
- Under this MOU, the FHWA and the EPA intend to exchange information, coordinate activities, provide opportunities for cross-training, and provide technical expertise and assistance in support of each other's Infrastructure Asset Management Programs.
- The MOU facilitates and encourages working arrangements between the agencies and fosters increasing dialogue to identify commonalities in Asset Management approaches including policy initiatives; and encourages information sharing in efforts to advance the state-of-the-practice of Asset Management.
- Protect and enhance our Nation's critical infrastructure.

Asset Management: Five Core Questions

1. What is the current state of my assets?
2. What is my required level of service/ performance?
3. Which assets are critical to sustained performance?
4. What are my best “Operations and Maintenance” and “Capital Improvement” investment strategies?
5. What is my best long-term funding strategy?

Example: Planning for Climate Change – Adaptation: the locally responsible thing to do to minimize or prevent the negative impacts of climate change.

- What do I own and where is it?
- Identify those assets that are vulnerable or at risk to be effected by sea level rise, intense rainfall, changes in temperature, etc.
- Has the vulnerability changed over time, for example, has the road been covered with water more often than in the past? Is the Department keeping track of this?
- What is the actual performance of these assets?
- What are my best “Operations and Maintenance” and “Capital Improvement” investment strategies?

Think Beyond the Short Term

- What data do we have?
- Physical – climatic
- Do we have historical data?
- Maintenance records?
- Do we have elevations? Level of detail?
- It's not just good enough to have a NOAA map
- Where exactly are we vulnerable? What milepost, what bridge, what facility?

Nation's Highways, Managed Assets

- What transportation facilities would you be willing to pay extra for, to ensure they were available when needed?
- Are they currently vulnerable? (to rising sea levels, flooding, earthquakes, extreme temperatures?)
- Are all roads equal?

What Are Possible Adaptation Responses?

- **Accommodate: Maintain and manage**
  - **Absorb increased maintenance / repair costs**
  - **Improve real-time response to severe events**
- **Strengthen structures / protect facilities**
  - **Design changes when rebuilding / new investment**
  - **Promote buffers, sea walls, etc.**
- **Relocate / avoid**
  - **Move key facilities**
  - **Site new facilities in less vulnerable locations**
- **Abandon and Disinvest**
- **Enhance redundancy**
  - **Identify system alternatives**

Thank you.

http://www.fhwa.dot.gov/hep/climate/index.htm

http://www.fhwa.dot.gov/infrastructure/asstmgmt/